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THE NEW DEPARTURE IN GEOGRAPHY*

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THE history of the development of secondary school geography in the United States during the past century may be divided into five or six stages, each characterized by some dominant idea.

1. *The Gazetteer Stage.* This kind of geography, dating from the time of Strabo, consisted of a description of the earth, giving statistics of location, area, population, government, products and social conditions of countries, states and cities. Only the great natural features were mentioned, such as mountains, rivers and arms of the sea. The only scientific part was astronomical and involved "the use of the globes." Globes properly made and mounted were used to demonstrate and solve a large number of mathematical problems in astronomy, geodesy and navigation. This has survived to our own day under the name of mathematical geography. The books of Morse and Parish (1812) are typical specimens, and are still not without interest for the geographer. About the middle of the last century they were displaced by something more palatable and

2. *The Wonder Book Stage* came in. Here my own personal experience begins. I have forgotten the title and author of my first Physical Geography and I would now give a good price for a copy. Perhaps it was Colton's (1867), Warren's (1863), Mitchell's or Montieth's. It contained descriptions of the more unusual, interesting and spectacular phenomena of the earth, such as volcanoes, earthquakes, geysers, cataracts, caverns, coral islands, salt lakes, icebergs, glaciers, ocean currents and waves, the will-o'-the-wisp, St. Elmo's fire, deserts, forests, and remarkable animals and races of mankind. The appeal was largely to the sense of wonder and awe. There was little or no attempt at scientific explanation, but frequent references to the power, wisdom and goodness of the Creator. The general tone was as pious as that of Sir John Mandeville's Travels, which it resembled in uncritical and credulous spirit. It seemed designed as much for religious as for scientific edification. The book was intensely interesting and gave students their first glimpse into the world of nature. Anybody could teach

*Read at the Geography Section of the High School Conference, University of Illinois, Nov. 22, 1912.

it and everybody liked it. Those were halcyon days for physical geography.

About 1873 the classic work of Guyot appeared and ushered in

3. *The Natural Theology Stage.* While the subject matter remained much the same as in the Wonder Book; it was organized and lifted to a high plane of teleological philosophy. It was enriched by the great generalizations of Humboldt on the origin of mountain ranges and the relations of vegetation to climate, and by the studies of Agassiz and others on the Alpine glaciers. Orographic, isothermal and plant zone maps and profiles, demonstrating the principal geographic relations of relief, climate and life, appeared. The plan of creation by which the round world, with its continents and oceans, its great features, its plants and animals, had all been brought into existence, especially and solely as a congenial home for a variety of men, was the great theme. It was a development on the geographic side of Paley's argument from design, and was pushed to its ultimate and foregone conclusions. "The continents are made for human societies, as the body is made for the soul," Guyot writes. "The conclusion is irresistible that the entire globe is a grand organism, every feature of which is the outgrowth of a definite plan of the all-wise Creator for the education of the human family, and the manifestations of his own glory."

Nearly all of the great generalizations which he taught so brilliantly and confidently have gone the way of his laws of relief and mountains by fracture. He was not in possession of sufficient facts and the facts he had were manipulated to fit into an artificial system. It has happened more than once in the history of human thought that the epoch when men believe that they have attained final and absolute truth is immediately followed by some discovery which upsets their conclusions and destroys their systems. It was Guyot's tragic fate to live long after the imposing structure of his science and philosophy was shown to be a castle in the air, and yet never to see that the doctrine of evolution had dissolved its foundations. His style was formal, stiff and grandiose and produced in the student's mind the impression that physical geography deals only with the remote and has nothing to do with the familiar land and sky at home. Yet by the introduction of European ideas and methods, by his broad view of the nature and scope of geography, and not least by the compilation and publication of a magnificent series of relief wall maps, Guyot contributed as much as any other one man to the advancement of geography in America.

The new learning and the new doctrine soon found its embodiment in textbooks which ushered in

4. *The General Physiography Stage,* using that overburdened word in its etymological sense of a general description of nature. In 1869 Huxley delivered in London a course of lectures which were published in 1877 under the title of Physiography. He reversed the usual order, and began at

home for Londoners with the Thames basin, thence branching out to rain, snow, ice, air, rivers, the sea, earthquakes, volcanoes, coral islands, the geological structure of the Thames basin, distribution of land and water, figure and movements of the earth, ending with the sun. Thus Huxley became the father of modern physiography.

This movement was not strongly under way in this country until the publication, in 1888, of Hinman's Eclectic Physical Geography, one of the most remarkable textbooks with which I am acquainted. Rigidly scientific, even technical, in organization and method, it began with a chapter of elementary physics, and dealt in logical order with planet, atmosphere, sea, land and life. The author availed himself of the then unpublished researches of Abbe, Dutton and others and succeeded in making a book in many respects ten years ahead of its time. It knew nothing of the base level of erosion or the geographic cycle, but with these exceptions presented clearly all the great processes of land sculpture found in the books of today. In the chapters on life he presented boldly, and for the first time to American high school students, the doctrines of Darwin and Huxley, heredity, variation, adaptation, environment, selection, evolution. In the chapter on man he took the bull by the horns and his life in his hands, as he himself expressed it to me, and showed by a wealth of argument and illustration the affinity of man with the apes, and his probable descent from ape-like ancestors. The book was a great success and was foremost in the field for ten years. One might do much worse than to use it now. I want to take this opportunity to offer my tribute of admiration for the courage and ability of one of the brightest men I have ever known, Russell Hinman, whose untimely death last spring came to me as a grievous personal loss.

Hinman's book was matched in England in 1891 by Dr. Mill's Realm of Nature, which for breadth of knowledge and vigor and charm of style still remains a model. In scientific method, physics, astronomy, geology, biology and anthropology, it is more inclusive and stiffer than Hinman, and for the teacher is one of the best introductions to physiography or, as Mill defines it, "the science of all creation."

5. *The Specialized Physiography Stage* differed from all the others in that its inauguration was formal and official. This was the publication in 1894 of the report of the Conference on Geography to the Committee of Ten of the National Educational Association. The Conference consisted of eight progressives and one stand-patter, who presented a minority report contesting nearly every recommendation of the majority. Of the eight progressives, four were eminent geologists. The field work of Powell, Gilbert, Dutton, Russell and others upon the arid western plateaus had furnished the material for a new science of land forms, based upon rock structure and sculpture, such as could be found only in America. Davis, by the use of these materials, supplemented by his own field studies in the Ap-

palachians, and by his illuminating conception of the physiographic cycle, developed geomorphology to a degree of perfection comparable to that of meteorology and oceanography, and had been teaching it at Harvard under the name of physiography for ten years. The Conference report gave this science its proper place as co-equal with the other members of the physical-geographical group, and it seemed the more prominent because it was new. In the emphasis laid upon land forms, scientific explanation and field and laboratory work, the report of the Conference was revolutionary.

The first textbook embodying the new ideas was Tarr's Elementary Physical Geography published in 1895. While retaining much of the old material, half the book was distinctly geological. The animus and initiative of the movement in the schools were distinctly due to Davis, whose pupil Tarr had been, and most of the books since published may be characterized as belonging to the Davis type. All others soon became out of date. In 1898 appeared the book of Davis & Snyder, which carried the geomorphological phase to its extremes, introducing many details and refinements of the new and fascinating science. The texts of Dryer in 1901, of Gilbert & Brigham in 1902, and second books from Tarr and Davis, left little to be desired in the way of textbooks of this type. The most momentous thing about them was that physical geography ceased to be a merely informational subject and made strong claims for a place alongside of physics, chemistry, and biology, as a subject for laboratory and field work involving scientific discipline. This claim was received by teachers of other sciences with scepticism, if not hostility.

Dr. John M. Coulter, writing in the School Review for February, 1896, on the Correlation of Science Studies in Secondary Schools, said: "There are those whose purpose and method are purely informational, subjects about which it is well enough that every intelligent man should be somewhat informed. Physical geography, astronomy, geology, physiology so-called, as mostly taught, all belong to this category, and are not included in the college demand for scientific training. They are necessary and exceedingly helpful subjects, but in the very nature of things cannot be handled in secondary schools other than as purely informational subjects. As such they contain no scientific training whatever, and such claim should not be made for them."

The gauntlet thus thrown down was taken up by Davis in the March number of the same Journal, and the possibilities of physical geography for scientific training were vigorously defended. Coulter's views were attributed to excusable ignorance and his positive assertion of them pronounced regrettable. To the same Journal, in 1896-7, Tarr contributed an article on the Teacher's Outfit in Physical Geography, designed as a guide to the selection and use of laboratory and library material, and another on Field Work in Geology and Physical Geography, based upon excursions around

Ithaca, one of the richest fields in the world.

In the same years Brigham published in the *Popular Science Monthly,* a paper on the New Geography, maintaining that geomorphology, based upon the central principle of the base level of erosion, underlies the whole subject of geography, modifying or controlling climate, organic distribution and the history of man, and in an article in the *School Review* made strong and unstinted claims for physical geography in the high school. In a contemporaneous paper,* Dryer argued at length that the new geography is scientific and rational, that it has been enriched by the addition of geomorphology, making it preponderatingly a natural science, and that therefore it must adopt the scientific or laboratory methods of study and teaching. "Thus the new geography becomes able to give not only information, but scientific training; the ability to discover facts and to see their relations. It takes geography out of the list of memory or useful knowledge studies, and plants it in the quickening current of modern scientific thought."

You all know the rest of the story. Textbooks and laboratory manuals of physical geography multiplied, culminating in the monumental Physiography of Salisbury and the Manuals of Davis and of Tarr. All of them have been and still are widely used. The new geography was an overwhelming success and has held the field for fifteen years. It is true that the percentage of students in geography has declined since 1896, but not so much as in physics, chemistry or botany.

Specialized physiography holds the field today, but its position is no longer undisputed. As early as eight years ago, doubts began to be whispered around as to whether it was really suitable for the average high school. The high school freshman was said to be too immature and too unfamiliar with even the elements of the sciences involved in an understanding of physiography. To do it justice required a much larger outlay for space, time and material than any but the strongest schools could command. Competent teachers were very scarce indeed, and in the hands of one without special preparation, the work degenerated into superficial and confusing textbook study, without maps, pictures or apparatus, of little value for exact information and of none at all for scientific discipline. The doubters and objectors were little heeded and were generally overwhelmed by the enthusiasm and commanding influence of the leaders, who were mostly university professors. I have preached pure physical geography as a sort of gospel—the science of the natural earth as it would be if no human being had ever lived upon it. I have advocated and defended it on every occasion to the best of my ability for thirty years. The burden of my propaganda has been that it is the open door to all the sciences, that there is nothing so

*Inland Educator, Vol. 4, p. 1. Studies in Indiana Geography, pp. 9-15.

good for getting young people's eyes open and for awakening an interest in nature. There is no net that will land so large a haul of scientific converts. Whether I have made a good fight or not, I have kept the faith and hold it still. Yet I believe that the sceptics were and are more than half right, and that the kind of physical geography I have stood for is in most schools impossible and will remain so for a long time to come.

My confidence was first shaken at the High School Conference in Geography held in this place four years ago, when I realized that there was a general demand among good teachers for something different, just what they hardly knew. They seemed to agree upon only one thing, that geography must be humanized and brought closer to the life of the common people. It was here that my eyes were opened and I caught my first vision of a newer geography, which might be more available, more attractive and more valuable to the great mass of students who are to be educated, not for the university, but for better citizenship.

However personal opinion may differ, a new departure in geography, a formidable revolt against the old regime is not only imminent, but is already here. The contention of Dr. Coulter and others that physical geography is less available than other sciences for scientific training has been sustained by the experience of unnumbered teachers. As I have argued at length elsewhere,* geography is at a disadvantage as a laboratory science because its real laboratory is out of doors. In physics and chemistry all the material may be placed on the student's desk. In botany and zoology such material is almost unlimited, it being necessary for the student to go into the field for only certain special lines of work. In physical geography, the student in the laboratory can be brought up against but a small portion of the phenomena to be studied, mostly those pertaining to the atmosphere and weather. A valley or a delta made in a 3x6 tank is a poor substitute for the work of a real stream. Mountains and plateaus built upon a moulding table, or shown on a model, are caricatures of the real things. All map work, however good and valuable in itself, is work with highly conventionalized and artificial representations of things, a training in the use of a specialized language rather than in scientific observation. The best field work which can be hoped for can bring the student in contact with only a small portion of the materials of geography. We dwellers on the interior plain are all land lubbers, and at home realize little of waves, tides, currents and shore forms. Only by a long journey can we be brought to any but a vague sense of mountains, volcanoes, geysers, glaciers or canyons. The organization and program of most schools absolutely prevent the use of even the limited field available. Not one teacher in ten can if he or she would, take a class out for systematic and continued field work. In many locali-

*Journal of Geography, Vol. 10, p. 1.

ties there is absolutely nothing to be seen on the face of the land within ten or more miles but a featureless plain. Are not the difficulties in the way of accomplishing much by field work for the average school practically insuperable?

Salisbury* and others maintain truly that better teachers and laboratories, and wiser school boards, superintendents and principals can do much to remedy the unfavorable conditions. But can we reasonably look for a general revolution in this or the next generation? We may and should work toward our highest ideals, a geographical millenium when school appropriations shall be made to cover all the expense of taking classes out into the field as liberally as they now are for bringing the material of physics, chemistry and biology into the laboratory, but is it not a rather forlorn hope? It seems to me that the contention that physical geography is available in schools to give scientific training in the same sense and degree as physics, chemistry and botany must be abandoned.

In turning away from the specialized physiography stage many roads are open for the advancement of a better geography in the schools. All of them lead in the direction of biogeography, or the relation of living creatures to their natural environment.

(Concluded in February)

THE HARBOR OF MARSEILLES

By GEORGE L. COLLIE,

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SITUATION.—Marseilles is situated on the east shore of a small bay, which projects northward from the Mediterranean sea, its central position causes it to be the chief port of France. There are about eighteen important harbors in France, the commerce passing through Marseilles is approximately equal to that belonging to any other two ports of the Republic, nearly 17 per cent of the total commerce of the country passes through this one harbor. Marseilles is naturally the chief center of French trade with the countries bordering the Mediterranean, its trade with the Levant being of especial importance. Again it is the chief receiving and distributing point for the French colonies, so largely is this true that it might well be designated the colonial port of France.

Character of the Harbor.—Marseilles is far from being an ideal harbor though in most respects it is above the average of those found in the region. It is a typical Mediterranean harbor like its great rival Genoa. The general

*Journal of Geography, Vol. 9, p. 57.

characteristics of this type may be described briefly to illustrate the species. The shore of the sea in the vicinity of Marseilles and eastward to the Dardanelles is for the most part bold, rocky and irregular in outline. There is an endless succession of embayments and projections, one after the other, bordered by cliffs or narrow coastal plains. The high hills and mountains of the interior send long spurs down into the sea and form ridge-like promontories, whose drowned ends result in the numerous islands and ledges so characteristic of this north shore region. Marseilles harbor is partially enclosed by a promontory and its accompanying islands and reefs and these afford fairly adequate protection, but as in the case of most Mediterranean harbors the protection is not complete. The harbor is open to the west and is exposed to heavy seas from that direction. It is necessary in all harbors of this type to supplement the work of nature by artificial works in order that shipping may obtain needed protection from wind and waves. At Marseilles this shelter is secured by means of a great stone and concrete breakwater, facing the west, 2½ miles long, built parallel to the shore and about one thousand feet from it on the average. The long narrow strip of water thus shut off from the rest of the bay is divided into a number of quadrilateral basins by means of broad stone quays, which are built from the shore to the breakwater at irregular intervals. Channels are reserved through the quays for the passage of shipping from one basin to another. There are six of these basins or bassins, to use the French form of spelling, more are being constructed on account of the demand for increased harbor capacity. The first basin to be built was the most southerly of the series, namely, the Bassin de la Joliette, which includes within its bounds 55 acres; within this area eight different steamship companies have their berths. The basins already built contain an area of 414 acres and they are lined with eleven miles of quays.

Near the south end of the breakwater is the entrance to the old port of Marseilles, a small, natural re-entrant, which penetrates eastward into the heart of the city. This port is about ¾ of a mile long, 800 to 900 feet wide and covers about 70 acres in extent. It is not over twenty feet deep and can be used only by sailing vessels and coasting steamers, although it is quite a rendezvous for submarine and torpedo boats from the neighboring naval port of Toulon. This small bay served as the sole port of Marseilles until 1854, when the Bassin de la Joliette was built. As the old port contains but one-seventh of the area of the present harbor, it is readily seen how inadequate it would be for the present commercial development of the city.

The old port and its vicinity form a veritable curiosity shop, one of the most interesting corners in the world. Merchants from all of the countries bordering the Mediterranean and from the remoter east, often in native costume, haggle and bargain over their cargoes, scattered about on the docks. Picturesque, lanteen-rigged boats, with brightly colored sails, from

the Adriatic are crowded in with Arab dhows from Algeria and curious, old-time fruit schooners from Spain and Greece. One easily imagines that he is in some oriental city and the feeling is heightened by the semi-tropical climate, the sunshine and the flowers of this fair Provencal port.

Storage and Berthing Facilities.—There are many warehouses in Marseilles, where merchandise may be stored, these buildings are located chiefly about the basins and the old port. Much of the merchandise entering the harbor is intended for re-exportation, consequently it remains but a short time in transit. Most of the steamship companies which engage in trade with the Orient via the Suez canal, make a practice of requiring their steamers to call at Marseilles and there trans-ship freight destined for ports not on their itinerary. In this way the city has come to be a transit port of importance and naturally requires extensive storage facilities for goods which are destined to remain but a few days. Much of this transit merchandise is stored in the bonded warehouses, owned and managed, by the Compagnie des Docks and Entrepots, surrounding the Bassin du Lazaret. The principal warehouse of this company is 1200 feet long and from four to six stories high; it contains floor space sufficient to accommodate 60,000 tons of merchandise at one time, the equivalent of 1500 freight car loads. In addition this company owns seven other buildings, one of which is intended solely for the storage of olive oil.

The opportunities for berthing steamers in this port are ample, there is good depth of water and a reasonable amount of dock room; steamers are enabled to come up alongside the quays, where they are discharged promptly, chiefly by hand labor, though there are unloading devices in abundance.

Importance of Marseilles.—This great French port is not only the premier harbor of the Mediterranean but it has widespread trade the world over. It is to be remembered that the colonies of France include such widely separated regions as French India, Annam, Cochin China, Argeria, Senegal, Kongo, Somali Coast, Reunion, Madagascar, Guiana, St. Pierre, New Caledonia and others. As already intimated the trade of these scattered lands centers chiefly in Marseilles and it thus becomes a world port of no small importance; the commerce which enters its portals is great and varied. This fact is all the more significant because the harbor is relatively small and has but about one-fifth the capacity of such a port as that of Hamburg, for example.

One of the marked features of Marseilles is its growth as a manufacturing point. Many of the raw products brought to its doors from all parts of the earth are worked up in the city itself. This condition is brought about partly by the fact that the connections of the city with the interior by river, canal and by rail are comparatively limited on account of the rugged topography of the surrounding country. It follows that transportation

charges to inland points are high and hence it becomes more feasible to manufacture the bulky, raw materials at the port of their reception. For example, Marseilles is one of the most important ports in the world for vegetable oils, such as olive oil, cocoanut oil, and also for glycerin and other animal oils and fats. This material, coming in from all parts of the globe, is made up into soap and candles almost entirely within the confines of Marseilles alone, where there are said to be 52 factories for this one purpose. In a similar way, there are many flour mills for grinding the grain, from Argentina, into flour; tanneries for making into leather the skins and hides from the colonies; refineries for the colonial crude sugar; smelting plants for ores, which come, often, in ballast and the like.

Marseilles can hardly hope to become a port of the first rank in the world's commerce, because of the difficulties and expense attending harbor construction and enlargement there, as well as the great cost of developing internal communications. These very difficulties, however, have compelled the people to turn their attention to manufacturing and thus they have been enabled to supplement the deficiencies and drawbacks of the harbor by the development of important industries. A thriving and growing city, now the second in France, has been the outcome of this enforced policy.

One of the important industries in the United States of which comparatively little is written is the production of sand and gravel. In 1911, according to a report by E. F. Buchard, just issued by the United States Geological Survey, the production of sand and gravel amounted to 66,846,959 short tons, valued at $21,158,583. The production of sand of all kinds was 40,253,977 tons, valued at $14,438,500, and that of gravel was 26,592,982 tons, valued at $6,720.083. The production of glass sand was valued at $1,547,733, an increase over the figures for 1910; the sand used for building in 1911 was valued at $7,719,286, a slight decrease as compared with 1910. This was accounted for by less activity in 1911 in the building trades, including that of concrete construction. The production of molding sand in 1911 was valued at $2,132,469, a marked decrease as compared with 1910. The production of all other sands in 1911, such as sand for grinding and polishing, fire sand, engine sand, and filtration sand, was valued at $3,043,012, an increase of over a million dollars in value as compared with 1910.

NOTES ON THE TRANSCONTINENTAL EXCURSION OF THE AMERICAN GEOGRAPHICAL SOCIETY*

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IT would not be easy to define in a single sentence the object and work of the excursion. The main aim of course, was for every man to get as much first-hand knowledge about the United States as possible. This was attained in many ways. There were considerable observations from the car windows so long as daylight prevailed, and there were many stops, sometimes two or three in a day for special features of the physical geography. Thus, in Fishkill, a little more than an hour out of New York, the party alighted from the train and ascended by the cable car to the summit of the highlands where one of the American members interpreted the topography of the mountains, and the industrial and commercial interests of the Hudson River lowlands as they spread out northward towards Albany. At Little Falls a brief stop was made. The Dolgeville railway was ascended to the top of the cliffs, and the topography and history of the Mohawk Valley were briefly described, and a representative of the State Engineer's office added an account of the Barge Canal. At Syracuse the party was taken by automobiles southward from the city to see on the hills the abandoned river channels and fossil Niagaras of the closing stages of the glacial time. On the banks of the Mississippi River in the early morning the train stopped for an hour while the party scrambled to the top of the bluffs to look out over the delta of the Chippewa, and the ponded waters of Lake Pepin. The topography around San Francisco was seen by a long ride through the rift valley, marked by the earthquake movements of 1906, and also by the railway ascent to the summit of Mount Tamalpais whose magnificent panorama includes the city, the Golden Gate, San Francisco Bay, and broad stretches of the Valley of California. At Loch Ivanhoe in Colorado the train stopped at the western entrance of the tunnel, and the party walked over the Hagerman Pass of the Continental Divide rejoining the train at the other end of the tunnel. At Asheville, one of the local summits of the Appalachians was reached by automobile and here lunch was taken looking out upon the wilderness of peaks and endless forests that characterize the mountains of North Carolina.

In addition to daily studies of the physicial features from the train and by special excursions, a great deal of attention was given to the phases of economic and industrial development, for it is recognized by the

*Announcement of this excursion and its itinerary has already been published in the *Journal*, Vol. XI, 1912, November, p. 68; December, pp. 105-6.

geographers, and it is especially emphasized by the geographers of Europe that the science does not come to its full fruition until it is taken in, not only the lands, but the interests and relations of those who live upon them.

From Buffalo the party visited the Lackawanna steel plant and for an hour or more were transported up and down among the various buildings and furnaces upon flat cars provided by the company. At Niagara one afternoon was devoted to the power house and the various industries, and the whole of the following day given to the falls and the gorge with many stops and brief lectures from experts by the way. In Chicago the party inspected in squads according to their choice, the Stock Yards, the business methods of the Sears, Roebuck Company, and the map-making plant of the Rand, McNally Company. A day was spent in the great open air iron pits of Hibbing, Minnesota, where again the party was transported by many miles of zig-zagging in a train of open cars to all levels of this greatest of iron mines. A characteristic stop of forty minutes was made in sight of one of the "Bonanza" farms of North Dakota, where various phases of North Dakota agriculture were explained from the observation end by experts of the State Agricultural college, the audience being assembled about the rear of the train. The Europeans were vastly interested in many phases of western agriculture, familiar to them by reading, but now seen for the first time. They and the Americans as well wondered at the extent to which dry farming has encroached upon the range country in North Dakota, Montana, Washington, and other parts of the arid West. A notable example of such successful dry farming was seen in central Washington. The party alighted at a little station called Almira, and were met by twenty-five to thirty automobiles gathered from everywhere by the industry of a railway official, the main object being to see the Grand Coulee, some twenty-five or thirty miles of dry canyon once occupied by the Columbia River. On the way to this, however, a dozen miles or more of rolling country were passed, covered with splendid wheat fields and the harvest was in progress by means of the combined reaping and threshing machines, drawn by motors or by teams of twenty horses. These crops were growing without irrigation in a region of perhaps twelve or fourteen inches of rainfall. In the Grand Coulee, the party were entertained at an outdoor lunch on the ranch of a graduate of the University of Michigan, and the party learned then, as they learned many times in the west that the graduates of our greatest universities are likely to be found wielding hard hands and wearing a pair of overalls. The after dinner feature of this day was a good sample of broncho "busting," by the trained cowboys of the ranch. That particular day was finished by a visit to an irrigated fruit farm, where all the ladies of the region had apparently gathered, and the foreigners got a new treat in the shape of a hundred foot table of sliced watermelon. At Tacoma the tallest member

of the party, a Chicago professor, tried in vain to measure with up-stretched arms the diameter of a log which had been pulled up out of the pond, and which was put to the saw under our eyes.

A few links in the excursion were made by trips over the water. At Toledo the party was entertained on the upper floor of a sky scraper, then taken across the foot of Lake Erie and up the Detroit River by boat. The blue waters of Puget Sound and the environing slopes of virgin forests and noble cities were likewise seen from the decks of a steamer. On the Mississippi River the party spent a happy day sailing from Memphis one hundred miles down the stream, watching the sand bars, snag boats, the means taken to protect the banks, the bordering forests, and it must be said—the lone steamer or two on waters that might carry the commerce of an empire. An old-fashioned landing was made in the twilight, head on to the shore, but it was not exactly old-fashioned to clamber up thirty feet of sand and find at the top a brilliantly lighted train of palace cars with dinner served.

It is hardly to be believed that one hundred representative business men of any Eastern town would come out by train at six o'clock in the morning a distance of fifty miles to meet a delegation of scholars, but this was done by the men of Fargo, in North Dakota, and the skidding of the automobiles in the wet gumbo outside of Fargo gave one a lasting remembrance of the quality of the black prairie soil. One of the pleasant memories of the Pacific Coast is the hours of inspection and entertainment on the campus of the new University of Washington in a glorious suburb of Seattle. Indeed if any European came to the coast cities expecting to find things a little crude, he was obliged to alter his conceptions, for he found paved streets, splendid buildings, innumerable beautiful bungalow homes, embowered in blossoms and greenery that never fail during the twelve months. The friendliest of social times was had in the Muir Woods, a splendid reservation of redwoods near the Golden Gate, on the day when Mr. John Muir, President David Starr Jordan and Mr. Luther Burbank were members of the party.

At the University of Utah the entire party sat on the platform at the chapel service attended by a thousand boys and girls and brief addresses were made by one German, one Swiss, and one American professor. Santa Fe brought the party into an old Indian and Spanish realm, and after a morning with pre-historic remains, the old adobe church of San Miguel was visited, and the ladies and gentlemen of Santa Fe gave a reception in the museum, an old Spanish building, once the governor's palace, now used for purposes of archaeology.

Nothing has been said in this story of the great places. Of course they were visited—the Yellowstone, six days; Crater Lake, three days; the Wasatch and Lake Bonneville, Great Salt Lake, and the irrigated fields and orchards of the valley, the Grand Canyon,—the masterpiece of nature in

North America—and not least, Phoenix and Roosevelt Dam, where the Salt River Valley, the driest and hottest region of Arizona, is being turned into one of the gardens of the continent.

Best of all was the acquaintance which developed and the friendships which were cemented. An eminent foreign professor in a fraternal gathering, held in one of the cars before the party broke up, said that he counted the excursion the culmination of his life, and he paid tribute to the universal hospitality that they had found both among the home members of the party, and the citizens of many communities, and he said that best of all, the men of Europe had come to know the American gentlemen. Not only friendship must result, but broad and just views of America by a group of foreigners supremely qualified to understand. The excursion was a kind of geographical congress on wheels, and it was a means of international comity.

A STUDY OF RESULTS OF GEOGRAPHY-TEACHING*

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A test in geography, covering the work of the grammar grades, was recently given to a class of university juniors and seniors numbering 128, for the purpose of ascertaining the geographical content of the students' minds. Since leaving the grammar school, 29 had neither studied nor taught geography, 95 had taken one semester's work in physical or commercial geography in the high school, 23 had completed a geography course in the University, and 23 had taught geography in either the grammar or rural schools. A few had studied the subject both in the high school and in the University and some others had had high school work and teaching experience.

The test consisted of the following twenty questions arranged in four groups of five questions each.

STUDY ON GEOGRAPHICAL TEACHING

Please answer the following five questions regarding yourself:

1. Have you pursued the study of geography since you left the grammar grades?
2. Have you studied geography in the University? in a Normal School?
3. Have you studied physical geography in High School?
4. Have you studied Commercial Geography in High School?
5. Have you taught geography? If so, in what grade of school? How long since?

*This study was made by the author while she was an advanced student in education and geography in the University of Wisconsin.

GROUP I

1. To what countries do the following belong? Java, Sahara, Porto Rico, Suez, New Zealand.
2. In what direction is Alaska from the North Pole?
3. What country leads in the production of cotton? of coal? of coffee? of wheat? in cotton manufacturing?
4. What are the causes of the change of seasons?
5. What and where are the following and why are they important? Yellowstone, Honolulu, Odessa, Gibraltar, Ceylon.

GROUP II

1. Name five chief crops of the U. S. and tell where each is raised.
2. What advantages or disadvantages of location have Boston, New Orleans, Cleveland, St. Louis, San Francisco?
3. Does North America or Europe have the advantage as to coast line? How is it an advantage?
4. Compare western Europe and eastern North America as to latitude and climate. Why the difference?
5. Where are the arid sections of the United States? Why are they arid?

GROUP III

Write the main points that you recall about each of the following topics:

1. Manufacturing in England.
2. The climatic conditions in Argentina.
3. The mineral resources of Germany.
4. The physical features of France.
5. The natural resources of Mexico.

GROUP IV

Give your best estimate of:

1. The size or area of Japan (compare it with some of our states if you prefer.)
2. The population of Canada.
3. The latitude of London.
4. The distance from Paris to Berlin.
5. The depth of the deepest parts of the ocean.

In group I three are memory questions and two pertain to mathematical geography. The answers to the first—*To what countries do the*

following belong—Java, Sahara, Porto Rico, Suez, New Zealand?—showed that 72 did not know that Java is a possession of the Netherlands or that France controls the Sahara, and 14 that Porto Rico belongs to the United States; 46 failed to give Suez, and 33 New Zealand, to Great Britain. One paper stated that Suez is "in South America but belongs to North America." and another assigned New Zealand to Greenland, probably having Iceland in mind.

To the second question—*In what direction is Alaska from the North Pole?*—54 declared that Alaska lies west, southwest, or southeast of it. One said, "Alaska is as far north as one can go without going to the North Pole;" another, that Alaska could not be located from the North Pole; another, that "on this side of the globe Alaska is south and on the other side north of the North Pole;" and another, "As the North Pole has not been definitely discovered as yet (!) it is hard to say, but Alaska is probably southwest or west of it."

The third question was, *"What country leads in the production of cotton? of coal? of wheat? of coffee? in cotton manufacture?"* As the United States produces three-quarters of the world's supply of cotton, one-third of its coal, one-quarter of its wheat, and ranks first in cotton manufacture, and since one country, Brazil, produces three-quarters of the world's coffee, it is surprising to be told that Germany, the United States, Australia, Japan, Egypt is first in coffee production; and South America, India, and Africa in cotton; Siberia in coal, England in wheat, and Switzerland in cotton manufacturing. Of the entire class, 7 missed on cotton, 29 on coal, 23 on coffee, and 31 on wheat; 4 failed in all and 3 in all but one; 7 answered the 5 points correctly.

The answers to question 4—*"What are the causes of the change of seasons?"*—were especially varied. Not one of the 128 mentioned the parallelism of the earth's axis; 29 gave the revolution of the earth around the sun and the inclination of the earth's axis; 62 gave only one of these, and 37 could not give even one of the three causes. The inclination of the earth's axis was put at nearly all angles from 23½° to 45°.

The fifth question—*"What and where are the following and why are they important: Yellowstone, Honolulu, Odessa, Gibraltar, Ceylon?"*—was answered corerctly by only 9; 50 missed Ceylon, 48 Honolulu, 45 Odessa, 12 Gibraltar, and 4 Yellowstone. Ceylon was called a river, a city, and placed in China, Java, India; Gibraltar was said to be a seaport, a "strait near Alaska," an "important port of Turkey," and "one of the largest cities of England noted for a rock." Honolulu was made "the chief city of China," "a city in Cuba noted for coffee," "a city in the Philippines." Odessa was a "straight of Asia," a "city in Persia noted for the date industry," "a desert," a "famous port in Asia Minor near Jerusalem," a "Mohammedan city in Arabia."

No doubt the long interval since geography had been studied is partly responsible for the hazy ideas shown by these answers, yet it seems probable that there had never been very accurate knowledge.

The summary of group I is as follows:

The number of papers worth—	
From 90-100 per cent was	0
From 80- 89 per cent was	6
From 70- 79 per cent was	10
From 60- 69 per cent was	20
From 50- 59 per cent was	43
From 40- 49 per cent was	20
From 30- 39 per cent was	18
From 20- 29 per cent was	9
From 10- 19 per cent was	2
Total	128

The highest paper was 88 per cent; the writer had had University and normal training and had taught geography in the 6th, 7th, and 8th grades.

Had these university students possessed even a little geographic foundation, the answers to the second group of questions might have been thought out. Three dealt directly with the United States, and two compared North America and Europe. Question 1 was: *"Name 5 chief crops of the United States and tell where each is raised."* If cotton, wheat, corn and any two other fairly important crops were given, the answer was considered correct. Of the answers, 17 were ranked as excellent*, 42 as good, 20 as fair, and 13 as poor.

Question 2 was: *"What advantages of location have Boston, New Orleans, Cleveland, St. Louis, San Francisco?"* A number simply located the cities (12 putting Cleveland on the Ohio River) and gave no reason for their location, or else merely gave some such general statement as, "All have advantages as ports either on an ocean or a navigable river." Most of the answers showed that the writers had not learned properly to associate mountains, climate, bodies of water, products and cities. A portion of one of the best answers is as follows: "New Orleans has the advantage of being a river port and semi-ocean port, also the additional advantage of railroads leading in from a very productive hinterland. A disadvantage might be in the climate which is too warm and unhealthful. It has the outlook of greater importance in the completion of the Panama Canal. Cleveland has the advantage of many railroads, lake transportation, and nearness to the coal and iron fields of Pennsylvania. Boston faces Europe, has a fine harbor and many railroads leading into it. The hinterland is not so rich as it might be." As a contrast to this another answer might be quoted: "Boston is not a railroad center and is of no great value to the United States at present."

*Excellent is above .92, good is .85 to .92, fair is .77 to .84, poor is below .77.

The third question was: *"Does North America or Europe have the advantage as to coast line? How is it an advantage?"* Considering all indentations, Europe and North America have each about 40,000 miles of coastline, but Europe being less than half the size of North America and having a coast on three sides only, is much more indented, yet 18 declared that North America is the more irregular. A new view of coastal indentation was given by another writer, who said, "North America has a better coastline than Europe, since the coast of the latter is broken too much and is not continuous on the north and west. The coast of the United States is not interrupted except in a few places." Four others concurred in this opinion. A few mentioned the fact that North America has a coast on the Pacific as well as the Atlantic, which was a good point. On this question 32 were graded as excellent, 26 as good, 15 as fair and 40 as poor; 15 did not answer.

Question 4 was: *"Compare western Europe and eastern United States as to latitude and climate. Why the difference?"* These answers varied widely; 15 placed Europe too far south. One said, "Spain and New Orleans are in about the same latitude which is 90°"! In giving reasons for difference in climate, one said that Europe receives "part of the Gulf Stream, some of the English Channel and of course the Atlantic ocean." Three thought that Europe has the colder, more severe climate. One paper stated: "The cold gulf stream comes down diagonally from the north, so the United States is much colder." Such indefinite statements as the following were rather common: "Western Europe is milder because of wind action and the relative height of land is greater." Many evidently had no knowledge of the latitude of Europe, of the westerlies, or of ocean currents upon which to base their decisions. Fourteen papers were graded as excellent, 30 as good, 37 as fair and 47 as poor.

Question 5—*"Where are the arid sections of the United States and why are they arid?"*—resulted in 3 excellent answers, 47 good, 44 fair and 34 poor. One writer believed there are no arid places in the United States, that "all parts were more or less moist." Another, that the arid lands are west of the Rocky Mountains, "because these mountains are so high that moisture cannot pass over them;" the writer evidently supposing that the prevailing winds come from the east. Another said plainly: "The east winds have deposited their moisture by the time the West is reached." These answers show the importance of a knowledge of direction, cause and effect of the great wind belts, as the trades and westerlies, where and why they deposit moisture; the belts of calms and the kind of weather to be expected there; where monsoons and cyclonic storms prevail; the effect of large bodies of water and of ocean currents upon climate. Summing up this group of questions we have 8 excellent answers, 44 good, 47 fair, 22 poor and 7 very poor.

Group III called for the main points which the student recalled about

(1.) Manufacturing in England.
(2.) The climatic conditions of Argentina.
(3.) The mineral resources of Germany.
(4.) The physical features of France and
(5.) The natural resources of Mexico.

These questions called for only a few of the most important facts about the countries mentioned, *yet nearly one-half of the students gave nothing, or next to nothing,* and only one received excellent. Five papers stated that Germany has no mineral resources, one that Argentina "is in South America, and therefore warm," another that Argentina has "too much rainfall" and another that "it has a delightful climate because it has sea breezes." Twenty omitted entirely the physical features of France and 27 the natural resources of Mexico; 12 omitted the entire group. Summary of group: 1 excellent answer, 16 good, 56 fair, 30 poor and 25 very poor.

As in nearly every subject, there must be a certain amount of memorizing in the study of geography, but if it be confined to the chief things and these as far as possible related as cause and effect, the work will not be burdensome. Interest may be stimulated by bringing out the connection between geography and present day happenings. An article in the Journal of Geography for December, 1910, entitled "Contemporary Geography from the Newspapers," gives an interesting and effective method of awakening this feeling of reality.

Group IV asked for the writer's best *estimate* of

(1.) The size or area of Japan.
(2.) The population of Canada.
(3.) The latitude of London.
(4.) The distance from Paris to Berlin.
(5.) The depth of the deepest parts of the ocean.

Most of the estimates of the size of Japan were much too low; it was compared to New Jersey, to Connecticut, to Massachusetts, to two-thirds of Wisconsin. The reason may be that the map of Asia, on account of the great size of the continent, is on a smaller scale than the maps of the other grand divisions, causing Japan to appear very small. This shows the importance of frequently calling attention to scales of different maps, and to the fact that a large country may appear very small or a small country very large.

The estimates of the population of Canada ranged from 800,000 to 50,000,000, in all cases except one which gave 25,000,000,000. The latitude of London was given on one paper as "25 per cent to 15 per cent;" three said it was "0° south of Greenwich," and another paper stated that it was in the same latitude as Chicago. A more accurate understanding of the meaning

of latitude and longitude, a knowledge of what countries and important points lie in about the same latitude or longitude, the ability to locate places in relation to each other, would go far toward making geography a real basis for further knowledge. The great importance of the Atlantic Drift, and the westerlies blowing over it, is most fully realized when one knows that London is as far north as the northern extremity of Newfoundland, fully 700 miles farther north than New York city, yet there is less than 2° F. difference in the mean annual temperature, that of London being 50.2° F. and that of New York 52° F.

Estimates of the distance from Berlin to Paris varied from 100 miles to 4,200 miles. One thought it about the distance from New York to St. Louis and another from Madison to Chicago. The depth of the deepest parts of the ocean was variously estimated as less than a mile, 10 miles, 25 miles, 150 miles. One said it was 2000 miles; another, "No one knows, it's all guess work," and one made it 25,000 miles! This writer may have remembered the number 25,000, the circumference of the earth, but have forgotten its connection. The extreme depth of the ocean might have made a more lasting impression if attention had been drawn to the fact that the greatest ocean depth corresponds very closely to the greatest mountain height, each being nearly 6 miles, a mere trifle in comparison with the earth's diameter.

Summary of group: One paper was graded excellent, 11 good, 39 fair, 51 poor, and 26 gave no answer.

The following table shows the grading of two groups of students:

	Ex.	G.	F.	P.	Very Poor	Total
Number having taught geography.....	0	4	7	11	1	23
Number having had no work in geography since grammar grades	0	2	5	14	8	29

The students come from 75 different places, 56 in Wisconsin, 8 in Illinois, 3 in Iowa, 3 in Michigan, 2 in Minnesota, and one each in New York, South Dakota, Montana, making 8 states in all. The grade of work done by the representatives of these different localities was very similar; the 1 excellent and 12 good represent 10 places, and the 13 very poor 8 places. The fairs and poors, numbering 102, were quite evenly distributed. Hence the needed reform is not confined to one state or section.

A few days later a part of the same test was given to a first year high school class of 238 pupils. The test was shortened to include only groups I and IV and a choice of any question in group III. The result was as follows:

Per cent.	Number of papers.
From 90 to 100	0
From 80 to 89	1
From 70 to 79	2
From 60 to 69	9
From 50 to 59	19
From 40 to 49	28
From 30 to 39	51
From 20 to 29	63
From 10 to 19	53
From 0 to 9	12
Total	238
Average	31%

Of the 238 pupils, 156 did not know the direction of Alaska from the North Pole; just one gave the parallelism of the earth's axis as a cause of the change of seasons, the majority not being able to give even one cause. Yellowstone, Gibraltar, and Porto Rico were the only places of those asked for in group I which were generally familiar to the class; but their estimates as called for in the last group compared very favorably with those of the university students. One of these papers contained the best answers to this group of any paper in either school. They were as follows: (1) Size of Japan,—New England plus New York (2) Population of Canada—7,000,000 (3) Latitude of London, 50° N. (4) Distance from Paris to Berlin, 700 miles. (5) Deepest parts of the ocean, 6 miles.

The difficulty which these students found in attempting to answer these questions points to the necessity for a higher ideal of what constitutes geography; for a more carefully organized treatment of selected geographical facts thus giving clear ideas of a *few important things;* and frequent reviews of these. The teaching of geography will have reached a far higher degree of efficiency when it gives the pupil a better grasp of principles and teaches fewer mere unconnected details; causes him to be familiar with the *chief* characteristics of the world's *important* countries and helps him to realize more fully the relation between the earth and its people.

AGRICULTURE IN THE UNITED STATES

(From the *Annual Report of the Secretary of Agriculture.*)

THE sugar crop from the beet was 600,000 tons a year ago; it is 700,000 tons this year. The sugar comes from the carbon-dioxide of the atmosphere, taking no valuable plant food from the soil. The process of growing is intensive agriculture, something new to all but our gardeners, and prepares the soil for increased yields of all other crops.

Our farmers get only half crops on the average, or 10 tons of beets from an acre. They are learning how to farm intensively and will grow twice this tonnage in a few years, when they will not fear reduction of duties.

Seven hundred acres of Egyptian and other long-staple cotton are being grown on the Colorado River in southern California, under research conditions that give good promise of eventually supplying the demand for such fibers. Thread makers of Europe are here inquiring into future supplies of long-staple cotton.

Our dry-land problems will be measurably solved through alfalfas from Siberia and non-saccharine sorghums from Africa.

Denmark buys our mill feeds and sells $40,000,000 of dairy products to Great Britain.

MOST PRODUCTIVE OF ALL YEARS

Most productive of all agricultural years in this country has been 1912. The earth has produced its greatest annual dividend. The sun and the rain and the fertility of the soil heeded not the human controversies, but kept on working in co-operation with the farmers' efforts to utilize them. The reward is a high general level of production. The man behind the plow has filled the Nation's larder, crammed the storehouses, and will send liberal supplies to foreign countries.

The prices at the farm are generally profitable and will continue the prosperity that farmers have enjoyed in recent years. The total crop value is so far above that of 1911 and of any preceding year that the total production of farm wealth is the highest yet reached by half a billion dollars. Based on the census items of wealth production on farms, the grand total for 1912 is estimated to be $9,532,000,000.

During the last 16 years the farmer has steadily increased his wealth production year by year, with the exception of 1911, when the value declined from that of the preceding year. If the wealth produced on farms in 1899 be regarded as 100, the wealth produced 16 years ago, or in

1897, is represented by 84, and the wealth produced in 1912 by 202.1. During the 16 years the farmers' wealth production increased 141 per cent.

The wealth production on farms during the last 16 years reached the grand total of more than $105,000,000,000. The stream of wealth has poured out of the farmers' horn of plenty, and in 16 years has equaled about three-quarters of the present national wealth.

CHIEF CROPS

Corn.—A field half as large again as Italy or nearly as large as either France or Germany is the area of this country's cornfield. This year's corn crop is the largest ever produced in this country, and reaches the staggering amount of 3,169,000,000 bushels. In value, too, the corn crop of this year is the highest on record, and reaches the fabulous amount of $1,759,000,000. This crop is worth to the farmer 20 per cent more than the average corn crop of the previous five years.

Hay has returned to its old place and is the crop that is second in value. The year was most productive for grass and hay, and the harvest of hay is measured by 72,425,000 tons. This is 16 per cent above the average crop of the previous five years. The value of this year's hay crop is $861,000,000, and has never been equaled. It exceeds the five-year average by 21 per cent. The importance of this crop to the farmer is better realized when it is observed that its value is greater than that of the cotton crop and nearly as great as the combined values of the wheat, tobacco, and potato crops.

The Cotton Crop will be next to the largest one in production and is likely to exceed the average crop of the five preceding years. It is estimated that the lint cotton of 1912 may be worth $735,000,000, an amount that exceeds that of 1911, although the crop of that year was much greater than this year's crop.

The seed out of the cotton crop of this year is estimated to be worth about $117,000,000, or over 6 per cent more than the five-year average, but its value has been exceeded by the crops of three preceding years. The combined value of the cotton lint and seed is estimated to be $860,000,000, or about one-half the value of the corn crop and a little less than the value of the hay crop. In value as well as in production the cotton crop of this year has been exceeded by only one year, and that was 1911 for production and 1910 for value.

The Wheat Crop is estimated to be worth $596,000,000, an amount which was exceeded by the value of the crops of 1909 and 1908, but no other year. The quantity of the crop, 720,333,000 bushels, is 11.2 per cent greater than the average production of the previous five years and has been exceeded by the crops of only two years. It is only 15,000,000 bushels below the next higher crop and only 28,000,000 bushels below the highest production.

The Oats Crop is fifth in order of value. Although the price has declined, the production is so enormous that the value of the crop is estimated to be $478,000,000, or a little more than one-half the value of the entire cotton crop. The remarkable production of 1,417,172,000 bushels was 51.5 per cent greater than the average of the preceding five years.

The Potato Crop is another one of highest production. Its 414,289,000 bushels are above the five-year average by 29 per cent, but the crop is worth only $190,000,000 on account of low prices. Three previous smaller crops have been more valuable.

With a production of 224,619,000 bushels, *the barley crop* far exceeds the largest one heretofore produced. It is 35.7 per cent above the average production of the five preceding years. The value of this year's crop, $125,000,000, is below the value of the crop of 1911, although the production of that year was 64,000,000 bushels less.

The Tobacco Crop has not quite risen to the high level of production of most of the other crops, yet it amounts to 959,437,000 pounds and is 7.1 per cent above the average of the preceding five years. The price has risen somewhat, so that the total value of the crop, $97,000,000, is about 11 per cent above the five-year average.

Flaxseed is the most valuable of the smaller crops, the amount for this year being about $39,000,000, or 32.4 per cent above the average value of the five preceding crops. The production is 29,755,000 bushels.

Rye is one of the crops that remain nearly stationary in production. This year's crop contains 35,422,000 bushels and is the largest one produced. Its value is $24,000,000.

The Rice Crop is about 8 to 10 per cent above the average production and would have been much greater had it not been damaged by the Mississippi River freshet. The value may amount to more than $20,000,000.

The Buckwheat Crop is the largest since 1868 and amounts to 19,124,000 bushels, worth $12,000,000.

All of the cereals, except wheat and rice, produced their largest crops in 1912 and, including those crops, made a gain of 25.6 per cent above the five-year average. The total production of the seven cereals is 5,609,807,000 bushels, a bulk of food so large as to be entirely beyond understanding. The combined value of this great mass of cereals is a little over $3,000,000,000 and is 15.8 per cent above the average of the previous 5 years.

The raising of *sugar beets* for sugar making can hardly be regarded as being an established industry 16 years ago. Under the encouragement of the law, this department and other agencies promoted the growth of this industry. The latest fruition of all these efforts appears in the magnificent testimonial of the production of 1912. The beet-sugar crop of 1899

amounted to 81,729 short tons. It increased to 218,406 tons in 1902, to 501,682 tons in 1909, and to 599,500 tons in 1911. The production of 1912 amounts to about 700,000 short tons, or a gain of about 100,000 tons over the preceding year. The beet-sugar production of 1912 is about one-fifth of the national consumption of sugar, and illustrates what can be done under the protection of the law and in consequence of practical and well-directed efforts. If the by-products of beet sugar manufacture are included, the value of this industry in 1912 is about $67,000,000.

The Cane-sugar industry fared badly on account of the Mississippi River flood. The production of sugar is the lowest since 1899, and the value of all the products of the industry is only about $34,000,000.

If to the value of the products of the beet and cane sugar industries are added the value of the sorghum sirup and maple sugar and sirup made on farms the total is about $117,000,000.

The year 1912 was a record-breaking one for crop production and crop values. Only two crops had been exceeded twice in former production, and these are wheat and tobacco. Only two crops had been exceeded once in production, and these are cotton and rice. All of the other crops stand at high-water mark—all of the cereals but wheat and rice, the great hay crop, potatoes, flaxseed, and beet sugar.

With respect to value, the only crops that have been exceeded three times are potatoes and cotton seed. The crops exceeded twice in value are wheat, cotton seed, tobacco, and rye, and the crops that have been exceeded once in value are cotton lint, beet sugar, and buckwheat. All the other crops reached their highest value in 1912, and these include all of the cereals except wheat and rye, the prominent hay crop, flaxseed, and beet-sugar by-products.

LIVE-STOCK PRODUCTS

The dairy cow is one of the principal producers of wealth on the farm, and the value of her products in 1912 is estimated at about $830,000,000, an amount which exceeds the value of the cotton lint and is nearly equal to the combined value of lint and seed. The wheat crop is worth only three-fourths as much as the dairy products.

The magnitude of the poultry industry is surprising. An egg may be worth only a cent and three-quarters, and yet 1,700,000,000 dozen eggs are worth $350,000,000, and these are the estimates for 1912. If to the value mentioned is added the value of the fowls raised, the products of the poultry industry on farms amounts to about $570,000,000. This is nearly equal to the value of the wheat crop and is more than three-fourths of the value of the cotton lint produced this year.

The animals sold from the farm and the animals slaughtered on it to-

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The animals sold from the farm and the animals slaughtered on it to-

gether number about 111,000,000, and the farm value of these animals is estimated at $1,930,000,000.

The total value of the animal products of the farm in 1912 is estimated to be about $3,395,000,000. This is a larger value than that of 1911, but is about $150,000,000 below the estimate for 1910, which is the only year that exceeds 1912 in value of animal products produced on farms.

While animal products are about one-third of the wealth production on farms in 1912, the crops are about two-thirds. Their value is $6,137,000,000, an amount which is vastly above the high-water mark of total crop value in 1911.

FOREIGN TRADE IN FARM PRODUCTS

Over a billion dollars is for the fourth time the value of the exports of farm products. They are sufficient to pay the expenses of the National Government. The billion-dollar mark was first reached in 1907, when the value of the agricultural exports amounted to $1,054,000,000. That amount has not since been equaled, but the exports of 1908 and 1911 exceeded a billion dollars in value, and in 1912 the amount fell short of the record exports by only $4,000,000.

Cotton is the great mainstay of the export trade and marked increase in its exports is conspicuous. Apples are supporting an increased export trade, which now amounts to about $10,000,000, both dried and fresh apples being included.

Beef and its products have gone into a sorry decline in the export trade, but wheat flour still maintains a high relative showing.

Packing-house products have declined in value of exports since 1906, when they reached the high value of $208,000,000, and have declined still more so in quantity because of the increasing prices.

The balance of trade in favor of exports of farm products was $278,000,000 in 1912. The favorable balance has been declining since 1908 for the reason that the imports have increased faster than exports.

THE CASTE SYSTEM OF INDIA*

THE institution of caste is a peculiar feature of Indian society. In no other country does anything of the same kind exist. Caste is a system by which the accident of birth determines once for all the whole course of a man's social and domestic relations. Throughout life he must eat, drink, dress, marry and give in marriage in accordance with the usages of

*Abstracted from *Peoples and Problems of India*, by Sir F. W. Holderness, (Holt, 56 cents.)

the community in which he is born. The word itself is of Portuguese origin, and is derived from the Latin *castus,* and signifies purity of blood. If it were not for the regulations relating to marriage, the restrictions regarding food and drink would be insufficient to maintain the institution. Its end and object is to keep society rigidly divided into a number of permanent groups and to prevent them from amalgamating. This cannot be accomplished without prohibiting marriage outside the group.

The system was obviously designed to glorify the Brahmans. All through they are seen to have the best of it. Secondly, the basis of the system was descent and purity of blood. And thirdly, occupations or callings were hereditary and position in the caste scale went with the nature of the occupation. The distinctive feature of the Indian caste system is that a man must not marry within his sub-caste group and must not marry outside his caste group.

Let us first take the case of the Rajputs as they are found in Rajputana, the home of the race. We find them divided into a number of clans. A clansman would not describe himself merely as a Rajput. He would add that he is a *Sisodia,* a *Rathor,* a *Kachwaha,* a *Jadon,* and so on, mentioning his clan. The caste rule under which he lives requires him to marry a Rajput woman and prohibits him from marrying a woman of his own clan. He is thus between two circles. He may not marry outside the larger circle, and he may not marry within the inner one.

The census enumerates over two thousand three hundred minor castes. The names of many of the most widely diffused castes indicate occupations. There is the writer caste, the herdsmen caste, the milkmen caste, the blacksmiths, the village watchmen, and so on. Community of occupation or function has evidently in these cases formed the basis of caste division. Each of these castes profess to have a traditional occupation, though many of the members have abandoned it. A blacksmith or a herdsman will often be found among the cultivators of a village. And as occupations change, new castes and sub-castes are thrown up. The Chumar caste works in hides and leather, and is regarded as unclean. But if a group in the caste should take to a more cleanly occupation, it will tend to form itself into a separate caste, will probably change its name, and so rise in the social scale. We are not unacquainted in our own country with the art of rising in the world. There are gradations of respectability, and men ordinarily find their wives in their own class. But the peculiarity of the Indian system is that the groups are much more permanent than with us, that they repel each other, that intercourse is prohibited by social and religious penalties, and that the individual, however high he may rise, carries his caste and its disabilities about with him till his death.

Caste is enforced by means of governing communities, often called panchayats. The caste may be likened to a guild or trades union, and gov-

erns itself. It sees that no member of the caste engages in a degrading occupation, works for lower wages than his brethren, eats forbidden food, or marries a woman of another caste. The extreme penalty is expulsion. No one will then eat or drink with the offender, visit his house, or marry his daughter. The Brahman will not serve him, the barber will not shave him, the washerman will not wash for him.

Attemps have been made in different parts of India to form a precedence table of castes, in the order of social esteem in which they are held by Hindus in the present day. The higher castes present no great difficulty. The Brahman heads the list in all provinces, followed by the modern representatives of the "twice-born" classes. Below the "twice-born" no uniform arrangements has proved possible. In northern India there are a good many castes of moderate respectability from whom most Brahmans will take water. These correspond to the fourth or "clean" Sudra class of Manu's code. Below these are classes from whom Brahmans will not take water, but whose touch does not pollute. Below these again come the "untouchables." But even here there are degrees. Inasmuch as the cow is sacred, the extreme of untouchability is reached by castes that will eat its flesh. In southern India, where Brahmanism has its stronghold, an extremely elaborate code of pollution exists. There are castes whose members defile a Brahman at a distance of twenty-four or thirty-six or even sixty-four feet, as the case may be. They carry an atmosphere of impurity about them. They may not enter a Hindu temple of the humblest sort, or pass through the high caste quarter of the village. When they see a Brahman they must leave the road or announce their approach by a special cry, like lepers in the middle ages. The very word "pariah" of our dictionaries comes from the name of the great laboring caste (the Paravan of the southern districts of Madras. They to men of the higher castes are unclean and polluted. Few of us when we use the word actually realize the full infamy of its meaning in its country of origin. The "depressed classes" in India form a vast multitude. Their numbers are estimated at from fifty to sixty millions.

Caste is in the air of India. It infects Mohammedans. It even infects the communities of Indian Christians. The early Roman Catholic missionaries retained it among their converts. It is one of the most serious questions with which modern missionary bodies have to deal.

It is easy to say hard things of the caste system and to point to its defects. The two practices of infant marriage and perpetual widowhood are so opposed to western ideas that any institution with which they are bound up or which encourages them seems to be self-condemned. Of infant marriage as practiced in Bengal there can be no defense. But a more rational custom prevails elsewhere, and the instances of the Rajput clans of Raj-

putana and of the Jats of the Punjab show that the caste system in this respect is capable of reform.

Is caste decaying? A confident answer is not possible. The spread of western education in India, the habit of travel, the growth of social and political discussion are powerful dissolvents. But as yet they affect a very limited class. Close observers tell us that the tendency to confine intermarriage to the narrowest circle within the caste was never stronger, and that infant marriage and perpetual widowhood are usages by no means on the decline.

SPEAKING OF MATHEMATICAL GEOGRAPHY

Did you know

1. That the width of the torrid zone on any planet is twice the number of degrees which the axis of that planet is inclined?

2. That there would be no temperate zones if the earth's axis were inclined 45° or more toward the plane of its orbit?

3. That the tropics of cancer and capricorn would be nearer the poles than the polar circles are if the earth's axis were inclined more than 45°?

4. That the longest continuous period of light or darkness on the earth never exceeds 24 hours except within the polar circles?

5. That only at the poles is there a six-months day and a six-months night?

6. That the city of Hammerfest in Norway has continuous daylight for about seventy days in summer and an equal period of darkness during the winter?

7. That the earth is some 3,000,000 miles nearer the sun in our winter than in our summer?

8. That a man who weighs 150 pounds on the earth would weigh about 70 pounds on the planet Mercury, 25 pounds on the moon, and nearly two tons on the sun?

9. That any and every day has a total length of 48 hours? Take Christmas day for example. It begins on the western side of the International Date Line, just over the line, and it lasts 24 hours at that place. At Calcutta, 90° E. longitude, Christmas day began six hours later than it did just west of the International Date Line, and it lasted 24 hours at Calcutta, making 30 hours since Christmas actually began. At London, the day began 6 hours after it began at Calcutta and it lasted 24 hours there, so that when Chrismas day ended at London, it had been 36 hours since it began at the first point mentioned, just west of the International Date

Line. At Chicago, 90° W. longitude, the day began still later by six hours and when it ended at Chicago, Christmas had already been in existence 42 hours. Ninety degrees farther west, or just east of the International Date Line, the day began six hours later and lasted 24 hours there. Thus 48 hours elapsed between the beginning and ending of Christmas day. The same is true of any day.*

The same person may have a 48-hour Christmas day by staying on the western side of the International Date Line during the 24 hours that Christmas exists there, and then crossing immediately to the eastern side of the line and remaining during the 24 hours that it continues in that place. Or by reversing his movements, he might escape Christmas day or any other day.

THE COFFEE INDUSTRY

THE Secretary of Agriculture will soon issue Bulletin No. 79, of the Division of Research and Reference, Bureau of Statistics, on the coffee industry. It contains a record of the history, origin, and cultivation of the tree; world's production, trade and consumption by countries; per capita consumption in specified countries; prices on New York market for a series of years; tariff rates in various countries; substitutes and adulterants. The bulletin is of more than usual interest, in view of the extensive use of coffee in the United States.

In the world's production of coffee, Brazil holds the pre-eminent place. In 1800 the exports from Brazil amounted to 1,720 pounds; they have steadily increased until in 1909 they were more than 2¼ billion pounds. The area in Brazil suitable for coffee cultivation covers about 1,158,000 square miles, or an area larger than the states of New York, Pennsylvania, Ohio, Indiana, Illinois, Iowa, Kansas, Missouri, Nebraska, Michigan, Wisconsin, Oklahoma, Texas and California; but the area under cultivation is small compared to that which could be cultivated, but little over two million acres being in coffee in 1905. About three-fourths of the world's output is grown in Brazil and the State of Sao Paulo alone produces one-half of the world's supply.

The history of the valorization scheme by Brazil is of great interest, not only to those interested in coffee, but to students of economics in general. The State of Sao Paulo borrowed more than seventy millions of dollars in 1908 and bought and stored nearly one billion pounds of coffee for the purpose of maintaining prices on the various markets, these having become very

*Owing to the irregularity of the International Date Line, the actual total length of any day is increased to about 5½ hours.

low, due to over-production. Since the buying and storing of this coffee the government through a committee has sold between three and four hundred million pounds.

The United States received coffee from 48 different countries in the past five years, the great bulk coming from South and Central America and Mexico; lesser amounts were imported from the Dutch East Indies and British West Indies, and from one and one-half to two and one-half million pounds from Arabia (Aden).

In the total amount of coffee consumed, the United States leads all other countries by a wide margin. The imports amounted to over one billion pounds annually in three of the last ten years. Netherlands, Cuba, Sweden, Norway, Finland and Belgium each have a larger per capita consumption than the United States. The United States consumption of coffee per capita is about 15 times that of the United Kingdom, while the consumption of tea in the United Kingdom is about six times greater than in the United States.

The price of Santos No. 7 coffee on the New York market rose from about 6½ cents per pound in 1902 to about 15 cents in 1911, an increase of more than 100 per cent in the ten year period.

Chicory, cultivated in Belgium, Netherlands, Germany, France, and the United States, is used perhaps more than any other one adulterant. In France the manufacture of chicory into a commercial product is quite an important industry. Certain coffee substitutes, including roasted chick peas, roasted acorns, etc., are used quite extensively in several European countries.

TEN POINTS TO EMPHASIZE IN TEACHING THE GEOGRAPHY OF FRANCE

1. The relatively small size, only about as large as Texas; practically the same size as Germany. Its colonial pessessions have 20 times the area of the home country.

2. Its relatively high latitude and mild climate. Marseilles is as far north as Boston, and the northern point of France is in the same latitude as southern Labrador; yet olive and orange groves thrive in the vicinity of Marseilles and grapes grow almost on the northern border of France. Here is a good opportunity to impress the real significance of the marine type of climate.

3. Its unsurpassed advantages of position for commerce; facing on the Atlantic, the Mediterranean and the English Channel. No country in the world has such a favorable situation; but France is not living up to its commercial opportunities.

4. The limited supply of minerals. France has coal and iron, the

basal commodities of modern industry, but not in such quantity as her great rivals, Germany, England and the United States. This is a matter of consequence.

5. The large proportion of arable land, the thrift of the French farmers, the great number of small farms worked by their owners, and the general condition of economic well-being which prevails. Relatively few Frenchmen emigrate. There are said to be as many separate farms in France as in the United States. France is one of the richest of the nations.

6. The extensive cultivation of grapes and the great quantity of wine manufactured,—a billion gallons a year.

7. The extensive cultivation of wheat and the general use of white bread, in contrast with the cultivation of rye and the use of rye bread in most of the continental countries. France is one of the three or four leading producers of wheat, despite its limited area.

8. The superior taste displayed in the better class of manufactures, particularly in textiles and pottery. France leads the world in artistic taste in manufacturing, and sets the fashions in women's dress. Silk manufactures are particularly important (Lyons).

9. The excellent highways in the country, the many canals and canalized rivers, the glitter and gaiety of Paris, its treasures of art, its beautiful boulevards and its magnificent buildings.

10. The extension of the French domain in Africa. A large part of the Sahara and of the Mediterranean coast has passed under French control, and French West Africa is six times as large as France. Under French domination, Algeria has a highly promising future. R. H. W.

UNITED STATES PRODUCES TWO-FIFTHS OF WORLD'S OUTPUT OF COAL

The United States has held first place among the coal-producing countries of the world since 1899, when this country supplanted Great Britain. In 1911 the total world's production of coal amounted to approximately 1,302,500,000 short tons, of which the United States contributed 496,221,168 tons, or 38.1 per cent, according to the United States Geological Survey. In the 12 years from 1899 to 1911 the production of the United States has increased over 250 per cent; from 1899 to 1911 Great Britain has increased its output about 50 per cent, from 198,146,731 to 304,521,195 tons. The United States in 191 produced almost 500,000,000 tons, or 63 per cent more than Great Britain in 1911; Germany's production of coal and lignite in 1899 was 93,640,500 short tons; in 1911 it was 258,223,763 tons, an increase of over 175 per cent. The combined production of Great Britain and Germany in 1911 was 562,744,958 short tons, which exceeded the output of the United States by only 66,500,000 tons, or 13.2 per cent. These three countries, United States, Great Britain, and Germany, produce more than 80 per cent of the world's total supply of coal.